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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/690,365	10/21/2003	Dennis J. Schloeman	10992119-4	4247

7590 07/11/2005

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EXAMINER	
NGUYEN, LAM S	
ART UNIT	**PAPER NUMBER**
2853	

DATE MAILED: 07/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/690,365	SCHLOEMAN ET AL.	
	Examiner	Art Unit	
	LAM S NGUYEN	2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 August 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25 and 42-54* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,8-15,19-25,42-46 and 49-54* is/are rejected.

7)☒ Claim(s) *5-7, 16-18, 47-48* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Terminal Disclaimer

The terminal disclaimer filed on 08/09/2004 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of the patent US 6659581 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1-4, 8-15, 42-46, 49-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller et al. (EP 0 674 933 A2) in view of Imanaka et al. (US 6116714).

Miller et al. disclose an inkjet printhead (*FIG. 6, element 34*), including:

nozzles *(FIG. 7, elements n1-n48)*;

firing resisters (*FIG. 1B, corresponding heaters with nozzles n1-n48*); and

fire pulse generator circuitry (*FIG. 12, element 82*) responsive to a start fire signal (*FIG. 12, element 80*) to generate a plurality of fire signals (*FIG. 12, elements 85-87*) each having a fire pulse (*FIG. 13, elements A-C*), by controlling the initiation of the fire pulse, wherein each fire pulse controls timing and activation of electrical current through selected firing resistors to thereby control ejection of ink drops from the nozzles (*FIG. 12: each fire signal controls the initiation of an ink ejection to cause sets of nozzles within the print head to fire at slightly different times (Abstract)*).

Miller et al. do not disclose wherein the plurality of fire signals each having a series of fire pulses, wherein at least two fire pulses have a different duration and the duration of each fire pulse is independently adjustable, and by controlling the initiation and duration of the fire pulses and the dead-time between the fire pulses to control ejection of ink drops from the nozzles; wherein the fire pulse generator circuitry comprises pulse-width/dead-time registers for holding pulse-width/dead-time values, wherein the duration/dead-time of the fire pulses is based on the pulse-width/dead-time values, **(Referring to claims 2, 10-11, 43, 45, 51-52)**, counters each preloaded and responsive to the initiation of a corresponding fire pulse to count down to a corresponding count value representing the duration/dead -time of the corresponding fire pulses **(Referring to claims 3-4, 12-13, ,44, 46, 53-54)**.

Imanaka et al. disclose a printing system having a carrier carrying N printheads, each includes nozzles and firing resistors (*FIG. 17*), and a fire pulse generator that generates a plurality of fire signals each having a series of fire pulses, wherein at least two fire pulses have a different duration the duration of each fire pulse is independently adjustable (*FIG. 4: Each signal has a preheating pulse and a heating pulse, wherein the heating pulse duration is different and independently adjusted from the one of the preheating pulse*), wherein the initiation and duration of the fire pulses are adjusted to control the ejection of ink drops from the nozzles (*FIG. 11B, 14:The initiation and the duration of the pulses determine the amount of ink discharge*), wherein the duration of the fire pulses is based on the pulse width values stored in pulse width registers (*FIG. 27, element 335*) and the initiation is based on a count down value from a preloaded counter (*FIG. 27, element 330, column 20, lines 27-30, and column 18, lines 15-22*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to modify the printing device disclosed by Miller et al. such that each fire signal includes a series of fire pluses and the initiation and duration of the fire pulses are adjusted to control the ejection of ink drops as disclosed by Imanaka et al..The motivation doing so is to make it possible to print a very high-quality image without the occurrences of the uneven density as taught by Imanaka et al. (*column 13, lines 4-6*).

Miller et al. also disclose the following claimed invention:

Referring to claims 8-9, 49-50: wherein an active start fire signal is provided to the fire pulse generator circuitry prior to each time a fire pulse is generated or only at the beginning of a print swath or a selected firing sequence (*FIG. 13, FIG.16*).

Referring to claim 15: wherein the first start fire signal is provided from a printer controller located external from the inkjet printhead assembly (*FIG. 11, element 72*).

2. Claims 19-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller et al. (EP 0 674 933 A2) in view of Imanaka et al. (US 6116714), as applied to the rejection above, and further in view of Umezawa et al. (US 6276776).

Miller et al., as modified, disclose the claimed invention as discussed above, except a module manager disposed on the carrier and implemented in a integrated circuit, wherein the module manager is adapted to receive a serial input data stream and corresponding input clock signal from a printer controller external from the inkjet printhead assembly and to demultiplex the serial data stream into N serial output data streams and to provide the N serial output data streams and N corresponding output clock signals based on the input clock signal to the N printheads.

Umezawa et al. disclose a printing apparatus having a carrier, four printheads disposed on the carrier, each printhead including nozzles and firing resistors, and a module manager disposed on the carrier and implemented in a integrated circuit (*FIG. 1, elements 29, 9A-D*), wherein the module manager (*FIG. 1, element 29*) is adapted to receive a serial input data stream from a printer controller external from the inkjet printhead assembly (*FIG. 1, element 100*) and to demultiplex the serial data stream and clock signal into four pulse trains and clock signals to provide to corresponding four printheads (*FIG. 1 and column 6, lines 5-63*).

Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to modify the printing device disclosed by Miller et al., as modified, such that including the module manager to receive a serial input data stream and an input clock signal and to demultiplex the serial data stream and the clock signal into N serial output data streams and clock signals to provide to the N printheads as disclosed by Umezawa et al. The motivation of doing so is to provide an inkjet printer which can prevent occurrence of degraded image quality due to temperature of a plurality of recording heads as taught by Umezawa et al. (*column 1, lines 36-40*).

Allowable Subject Matter

Claims 5-7, 16-18, and 47-48 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Referring to claim 5: The primary reasons for the indication of the allowability of claim 5 is the inclusions therein, in combination as currently claimed, of the limitation that controllers controlling corresponding counters, each controller providing a corresponding fire pulse and

activating a start signal to the corresponding counter to initiate the count, and wherein each counter activates a stop signal to the corresponding controller to terminate the corresponding fire pulse when the count value is reached is neither disclosed nor taught by the cited prior art of record, alone or in combination.

Referring to claims 6, 47: The primary reasons for the indication of the allowability of claim 6, 47 is the inclusions therein, in combination as currently claimed, of the limitation that a start fire detection circuit receiving the start fire signal and verifying that a valid active start fire signal is received is neither disclosed nor taught by the cited prior art of record, alone or in combination.

Referring to claim16: The primary reasons for the indication of the allowability of claim 16 is the inclusions therein, in combination as currently claimed, of the limitation that a module manager disposed on the carrier and receiving a second start fire signal from a printer controller located external from the inkjet printhead assembly and providing the first start fire signal representing the first start signal to each of the N printheads is neither disclosed nor taught by the cited prior art of record, alone or in combination.

Claims 7, 17-18, 48 are allowable because they depend directly/indirectly on claim 6, 16, 47.

Response to Arguments

Applicant's arguments filed 08/09/2004 have been fully considered but they are not persuasive.

The applicants argued that Miller and Imanaka fail to disclose at least two fire pulses having different durations. In contract, as discussed above, at least shown in FIG. 14, Imanaka

discloses a plurality of fire signals, each has a preheating pulse and a heating pulse, wherein the heating pulse duration is different and independently adjusted from the one of the preheating pulse in order to control the amount of ink discharge such that the amount of ink discharged from each nozzle is the same at all time as pointed out by the applicants. In addition, in response to the applicants' argument that the duration of pulses is constant, the examiner points to column 12, line 37 to column 13, line 11 (in Imanaka), in which Imanaka teaches that the pulse width is constant at a constant temperature. However, Imanaka suggests that the pulse width of the heating pulse and the preheating pulses is adjusted in accordance to the resistance values of the firing elements and the change of the head temperature.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAM S NGUYEN whose telephone number is (571)272-2151. The examiner can normally be reached on 7:00AM - 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, STEPHEN D MEIER can be reached on (571)272-2149. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LN

September 3, 2004

Stephen D. Meier
Primary Examiner